Objection to the Drawings:

The drawings have been objected to by the Draftsperson as informal. Applicants have provided, attached hereto, a draft set of formal Figures to replace the informal figures. Acceptance of these Figures is hereby requested.

Rejections under 35 U.S.C. §103

Claims 1-57 were rejected under 35 U.S.C. §103(a) as being unpatentable over Casey (U.S. Patent 6,493,349 B1).

Casey:

Casey describes a VPN network infrastructure which enables private network communications over a shared network. The infrastructure includes a shared network partitioned into at least two separate areas. A first router is connected to a first area and configured to distribute first router VPN information across the first areas. The first router VPN information includes a VPN identifier which is assigned to the first router. It also includes a second router connected between the first area and a second area which is configured to distribute second router VPN information across the first area. The second router VPN information includes a VPN identifier which is assigned to the second router which is the same VPN identifier assigned to the first router. (Casey, Abstract).

Combination neither describes nor suggests claimed invention

In order to support a rejection under 35 U.S.C. §103, the combination of references cited by the Examiner must show or describe every limitation of the claimed invention. Casey does not meet this burden.

The Examiner states, at page 3 of the Office Action:

> "...Casey teaches: A method for establishing a label switched path for forwarding a packet with a label stack in a communication network (Figures 2 & 3 show a method for establishing a tunnel or forwarding a packet through a VPN AREAs in a communication network, where VPN area can be MPLS or label switched), the communication network including a first label switched domain and a second label switched domain interconnected by a non-label switched domain (Figure 2 & 3 shows establishing a tunnel or forwarding a packet through a VPN Area in a communication network where a VPN area can be MPLS or label switched as well as Dedicated IP Net GRE Tunnel area or non-label switched using VPN identifiers or labels for first and second domain)
>
> Establishing a tunnel across the non-label switched domain which connects the first label switched domain and the second label switched domain (Fig. 2 shows establishing a tunnel across VPN areas. Figure 3 shows the VPN areas can be MPLS or label switched and non-MPLS or non-label switched in any order).
>
> Encapsulating the packet and label stack to form a tunnel packet (Fig. 2 shows encapsulating a packet and label stack to form a tunnel packet across a VPN area or col. 6 line 21 – col. 7 line 36)
>
> forwarding the tunnel packet through the tunnel (Fig. 2 shows forwarding a tunnel packet through the tunnel between VPN Areas)..."

Applicants respectfully disagree with the Examiner's interpretation of Casey, for at least the reason that Casey neither describes, suggests or in any way addresses the notion of label stacks, or the implementation details of transferring label stacks across non-MPLS compliant devices.

The Examiner states that Casey teaches, at Figure 2, col. 6-7 the step of encapsulating the packet and label stack to form a tunnel packet. However, Applicant's reading of the portion of the specification, and examination of the Figures shown no such suggestion or teaching. Rather, Casey states, in this portion of the text, only (in part):

"... Fig. 2 illustrates a communication path between two private networks which traverses two VPN areas. Each VPN area is bordered by VBRs and contains other nodes that operate as part of the base network but are unaware of the IP VPN service because traffic is tunneled through them...

A form of VPNID is used in the VPN membership dissemination operation. Typically, this form of VPNID, which we call the local VPNID, has only to be unique within a VPN area. To facilitate re-engineering of VPN areas any VPNID used should be unique within an Autonomous System.

... Within each VPN area, a VPN area specific mechanism is then used to establish tunnels between all VRs serving the particular IP VPN. All private network traffic travels across a VPN area in a single tunnel hop. Traffic traveling between VPN areas is forwarded by VPs in the gateway VBRs that have been configured to be part of the VPN...

... In each VPN area a different tunneling mechanism choice may be in effect, depending on the base network. For example in one VPN area tunnels may be realized by GRE over a base network that is IP and in another tunnels may be realized by ATM SVCs over a base network that is ATM. The VRs in gateway VBRs transfer traffic between tunnels...."

Thus, although Casey generally describes VPNs, no mention, description or suggestion is made of the limitations of the claims, in particular "...establishing a tunnel across the non-label switched domain which connects the first label switched domain and the second label switched domain ... *encapsulating the packet and label stack to form a tunnel packet...*" as recited in independent claims 1, 10 and 19. For at least this reason, claims 1, 10 and 19 are patentably distinct over Casey, and the rejection should be withdrawn.

With regard to claim 2, the Examiner states "... the examiner interprets "Mapping a top label of the label stack" as VPNID per col 6, line 20 – col. 7 line 11) as claimed in claim 2..." However, Applicants note that the VPNID of Casey is not included in the encapsulated portion of the packet, as is the label stack of the present claims (step "encapsulating ... the .label stack" in claim 1). Accordingly, for at least this reason, claim 2 is also patentably distinct over Casey, and the rejection should be withdrawn.

With regard to Claim 9, the examiner states, at page 4 "... Wherein encapsulating the packet and label stack information includes providing an MPLS identifier in the tunnel packet such that the second label switched domain may identify the packet and the label stack (A VPNID per col. 6 line 21-col. 7 line 21 is provided to identify the encapsulated packet is tunnel across VPN Area which can be a MPLS or Non-MPLS area per Fig. 3 as claimed in claim 9.

Applicants respectfully disagree that the VPNID is analogous to an MPLS identifier. Applicants have amended claim 9 to more clearly distinguish claim 9 over Casey, and thus submit that Casey neither describes nor suggests "...providing an MPLS identifier in the tunnel packet such that the second label switched domain *may identify the packet as an MPLS type packet and retrieve and label stack...*" No such indication of type of protocol that is used in a VPN area is taught or suggested by the VPNID of Casey. For at least this reason, claim 9 is patentably distinct over Casey.

Independent claims 28, 34, 40, 46, 50, 53 and 57 include limitations similar to those in claims 1, 2 or 9 described above, and are therefore patentably distinct for at least the reasons described above.

Applicants have made a diligent effort to place the claims in condition for allowance. However, should there remain unresolved issues that require adverse action, it is respectfully requested that the Examiner telephone Lindsay G. McGuinness, Applicants' Attorney at 978-264-6664 so that such issues may be resolved as expeditiously as possible.

For these reasons, and in view of the above amendments, this application is now considered to be in condition for allowance and such action is earnestly solicited.

Respectfully Submitted,

2/3/2004
Date

Lindsay G. McG
Mary Steubing, Reg. No. 37,946
Lindsay G. McGuinness, Reg. No. 38,549
Attorney/Agent for Applicant(s)
Steubing McGuinness & Manaras LLP
125 Nagog Park Drive
Acton, MA 01720
(978) 264-6664

Docket No. 2204/A01 120-190
Dd: 12/10/2003

CLAIMS

1. (original) A method for establishing a label switched path for forwarding a packet with a label stack in a communication network, the communication network including a first label switched domain and a second label switched domain interconnected by a non-label switched domain, the method comprising:

establishing a tunnel across the non-label switched domain which connects the first label switched domain and the second label switched domain;

encapsulating the packet and label stack to form a tunnel packet; and

forwarding the tunnel packet through the tunnel.

2. (original) A method according to claim 1, wherein establishing a tunnel includes mapping a top label of the label stack to the tunnel.

3. (original) A method according to claim 1, wherein the tunnel is an IP tunnel.

4. (original) A method according to claim 3, wherein the IP tunnel is a Generic Routing Encapsulation (GRE) tunnel.

5. (original) A method according to claim 4, wherein encapsulating the packet and label stack information includes providing a label switching protocol identifier such that the second label switched domain may identify the packet and label stack.

6. (original) A method according to claim 1, wherein the first label switched domain is a Multiprotocol Label Switching (MPLS) domain.

7. (original) A method according to claim 1, wherein the second label switched domain is a Multiprotocol Label Switching (MPLS) domain.

8. (original) A method according to claim 1, wherein the first label switched domain is a MPLS domain and the second label switched domain is a MPLS domain.

9. (currently amended) A method according to claim 8, wherein encapsulating the packet and label stack information includes providing an MPLS identifier in the tunnel packet such that the second label switched domain may identify the packet as an MPLS type packet and retrieve and label stack.

10. (original) A device for establishing a label switched path for forwarding a packet with a label stack in a communication network, the communication network including a first label switched domain and a second label switched domain interconnected by a non-label switched domain, the device comprising:

label switching forwarding logic for identifying the next hop for the packet;

encapsulating logic for encapsulating the packet and label stack information to form a tunnel packet and for establishing a tunnel across the non-label switched domain which connects the first label switched domain and the second label switched domain; and

forwarding logic for forwarding the tunnel packet through the tunnel.

11. (original) A device according to claim 10, wherein the label switching forwarding logic includes mapping logic for mapping a top label of the label stack to the tunnel.

12. (original) A device according to claim 10, wherein the tunnel is an IP tunnel.

13. (original) A device according to claim 12, wherein the IP tunnel is a Generic Routing Encapsulation (GRE) tunnel.

14. (currently amended) A device according to claim 13, wherein the tunnel packet includes a label switching protocol identifier such that the second label switched domain can identify the packet as a label switched protocol packet and retrieve the ~~and~~ label stack.

15. (original) A device according to claim 10, wherein the first label switched domain is a Multiprotocol Label Switching (MPLS) domain.

16. (original) A device according to claim 10, wherein the second label switched domain is a Multiprotocol Label Switching (MPLS) domain.

17. (original) A device according to claim 10, wherein the first label switched domain is a MPLS domain and the second label switched domain is a MPLS domain.

18. (original) A device according to claim 17, wherein the tunnel packet includes an MPLS identifier such that the second label switched domain may identify the packet and label stack.

19. (original) A computer program packet for use on a computer system for establishing a label switched path for forwarding a packet with a label stack in a communication network, the communication network including a first label switched domain and a second label switched domain interconnected by a non-label switched domain, the computer program product comprising a computer usable medium having computer readable program code thereon, the computer readable program code including:

program code for establishing an IP tunnel across the non-label switched domain which connects the first label switched domain and the second label switched domain;

program code for encapsulating the packet and label stack information to form a tunnel packet; and

program code for forwarding the tunnel packet through the tunnel.

20. (original) A computer program product according to claim 19, further including program code for mapping a top label of the label stack to the tunnel.

21. (original) A computer program according to claim 19, wherein the tunnel is an IP tunnel.

22. (original) A computer program product according to claim 21, wherein the IP tunnel is a Generic Routing Encapsulation (GRE) tunnel.

23. (currently amended) A computer program product according to claim 22, further including program code for providing a label switching protocol identifier in the tunnel packet such that the second label switched domain may identify the packet as a label switched protocol packet and retrieve the ~~and~~ label stack.

24. (original) A computer program product according to claim 19, wherein the first label switched domain is a Multiprotocol Label Switching (MPLS) domain.

25. (original) A computer program product according to claim 19, wherein the second label switched domain is a Multiprotocol Label Switching (MPLS) domain.

26. (original) A computer program product according to claim 19, wherein the first label switched domain is a MPLS domain and the second label switched domain is a MPLS domain.

27. (original) A computer program product according to claim 26, further including program code for providing an MPLS identifier in the tunnel packet such that the second label switched domain may identify the packet and label stack.

28. (currently amended) A method for establishing a label switched path for forwarding a packet with a label stack in a communication network, the communication network including a first label switched domain and a second label switched domain interconnected by a non-label switched domain, the method comprising:

establishing a tunnel across the non-label switched domain which connects the first label switched domain and the second label switched domain;

receiving a tunnel packet from the tunnel, the tunnel packet comprised of an encapsulated packet and label stack, wherein the tunnel packet includes a label switching protocol identifier such that the second label switched domain may identify the packet as a label switched protocol packet;

decapsulating the encapsulated packet and label stack responsive to the label switching protocol identifier; and

forwarding the decapsulated packet and label stack across the second label switched domain.

29. (original) A method according to claim 28, wherein the first label switched domain is a MPLS domain and the second label switched domain is a MPLS domain.

30. (original) A method according to claim 28, wherein the tunnel is an IP tunnel.

31. (original) A method according to claim 30, wherein the IP tunnel is a Generic Routing Encapsulation (GRE) tunnel.

32. (cancelled)

33. (original) A method according to claim 29, wherein the tunnel packet includes a MPLS identifier such that the second label switched domain may identify the packet and label stack.

34. (currently amended) A device for establishing a label switched path for forwarding a packet with a label stack in a communication network, the communication network including a first label switched domain and a second label switched domain interconnected by a non-label switched domain, the device comprising:

receiving logic for receiving a tunnel packet from a tunnel across the non-label switched domain which connects the first label switched domain and the second label switched domain, the tunnel packet comprised of an encapsulated packet and label stack and a label switching protocol identifier such that the second label switched domain may identify the packet as a label switched protocol packet and retrieve the label stack;

decapsulating logic for decapsulating the encapsulated packet and label stack; and

forwarding logic for forwarding the decapsulated packet and label stack across the second label switched domain.

35. (original) A device according to claim 34, wherein the tunnel is an IP tunnel.

36. (original) A device according the claim 35, wherein the IP tunnel is a Generic Routing Encapsulation (GRE) tunnel.

37. (original) A device according to claim 34, wherein the first label switched domain is an MPLS domain and the second label switched domain is a MPLS domain.

38. (cancelled)

39. (original) A device according to claim 37, wherein the tunnel packet includes a MPLS identifier such that the second label switched domain may identify the packet and label stack.

40. (currently amended) A computer program product for use on a computer system for establishing a label switched path for forwarding a packet with a label stack in a communication network, the communication network including a first label switched domain and a second label switched domain interconnected by a non-label switched domain, the device comprising: the computer program product comprising a computer useable medium having computer readable program code thereon, the computer readable program code including:

program code for establishing a tunnel across the non-label switched domain which connects the first label switched domain and the second label switched domain;

program code for receiving a tunnel packet from the tunnel, the tunnel packet comprised of an encapsulated packet and label stack and a label switching protocol identifier such that the second label switched domain may identify the packet as a label switched protocol packet and retrieve the label stack;

program code for decapsulating the encapsulated packet and the label stack; and

program code for forwarding the decapsulated packet and label stack across the second label switched domain.

41. (original) A computer program product according to claim 40, wherein the tunnel is an IP tunnel.

42. (original) A computer program product according to claim 41, wherein the IP tunnel is a Generic Routing Encapsulation (GRE) tunnel.

43. (original) A computer program product according to claim 40, wherein the first label switched domain is a MPLS domain and the second label switched domain is a MPLS domain.

44. (cancelled)

45. (cancelled)

46. (currently amended) In a communication system having a first label switched domain interconnected with a second label switched domain by a non-label switched domain, a method for forwarding a label switched packet from the first label switched domain to the second label switched domain, the method comprising:

establishing a tunnel from an egress device of the first label switched domain to an ingress device of the second label switched domain over the non-label switched domain;

encapsulating the label switched packet by the egress device of the first label switched domain;

forwarding the encapsulated label switched packet by the egress device of the first label switched domain over the tunnel to the ingress device of the second label switched domain;

decapsulating the encapsulated label switched packet by the ingress device of the second label switched domain; and

forwarding the decapsulated label switched packet by the ingress device of the second label switched domain based upon label switching information in the packet, the label switching information including a label switch protocol identifier identifying the packet as a label switched protocol type packet, and at least one label.

47. (original) A communication system according to claim 46, wherein the first label switched domain is a MPLS domain and the second label switched domain is a MPLS domain.

48. (original) A communication system according to claim 46, wherein the tunnel is an IP tunnel.

49. (original) A communication system according to claim 48, wherein the IP tunnel is a Generic Routing Encapsulation (GRE) tunnel.

50. (currently amended) A tunneling protocol for interconnecting a first label switched domain and a second label switched domain, the tunneling protocol comprising:

encapsulation means for encapsulating a payload packet from a label switched protocol, the payload packet including at least one label; and

a protocol type indicator for identifying the label switched protocol, the protocol type indicator appended to the encapsulated payload packet for indicating to a receiving device that the payload packet includes at least one label.

51. (original) A tunneling protocol according to claim 50, wherein the label switched protocol is MPLS.

52. (original) A tunneling protocol according to claim 50, wherein the tunneling protocol is a modified Generic routing Encapsulation (GRE) protocol.

53. (currently amended) A communication system comprising a first label switched domain having an egress device, a second label switched domain having an ingress device and a non-label switched domain which couples the egress device of the first label switched domain to the ingress device of the second label switched domain, wherein a label switched path for forwarding a packet and a label stack is established by

establishing a tunnel from an egress device of the first label switched domain to an ingress device of the second label switched domain over the non-label switched domain;

encapsulating the packet and label stack by the egress device of the first label switched domain;

forwarding the encapsulated packet and label stack by the egress device of the first label switched domain over the tunnel to the ingress device of the second label switched domain;

decapsulating the encapsulated packet and label stack by the ingress device of the second label switched domain; and

forwarding the decapsulated packet and label stack by the ingress device of the second label switched domain based upon label switching information in the packet, the label switching information including a protocol identifier identifying the packet as a label switched protocol packet.

54. (original) A communication system according to claim 53, the first label switched domain is a MPLS domain and the second label switched domain is a MPLS domain.

55. (original) A communication system according to claim 53, wherein the tunnel is an IP tunnel.

56. (original) A communication system according to claim 55, wherein the IP tunnel is a Generic Routing Encapsulation (GRE) tunnel.

57. (currently amended) A communication system comprising:

a first label switched domain for forwarding a label switched packet, the first label switched domain having a plurality of label switching devices including an egress device;

a second label switched domain for forwarding the label switched packet, the second label switched domain having a plurality of label switching devices including an ingress device; and

a non-label switched domain having a plurality of forwarding devices, the non-label switched domain coupled the egress device of the first label switched domain to the ingress device of the second label switched domain; wherein:

the egress device establishes a tunnel from the first label switched domain to the ingress device of the second label switched domain across the non-label switched domain;

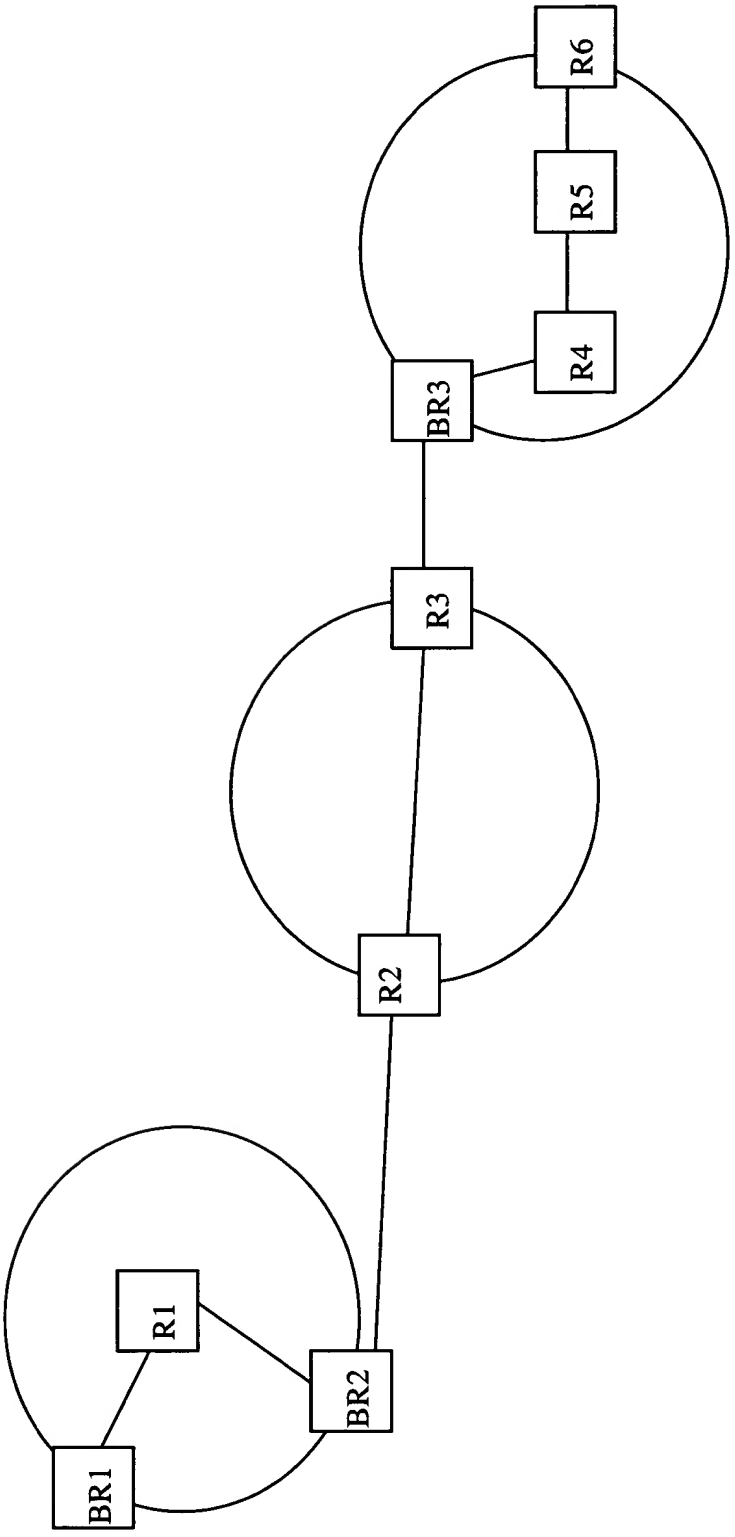
the egress device encapsulates the label switched packet;

the egress device forwards the encapsulated label switched packet over the tunnel to the ingress device of the second label switched domain, the encapsulated label switched packet including a protocol identifier for notifying the ingress device that the packet should be decoded according to a label switched protocol;

the ingress device receives the encapsulated label switched packet from the tunnel;

the ingress device decapsulates the encapsulated label switched packet; and

the ingress device forwards the decapsulated label switched packet based on label switching information in the packet.



PRIOR ART

Figure 1

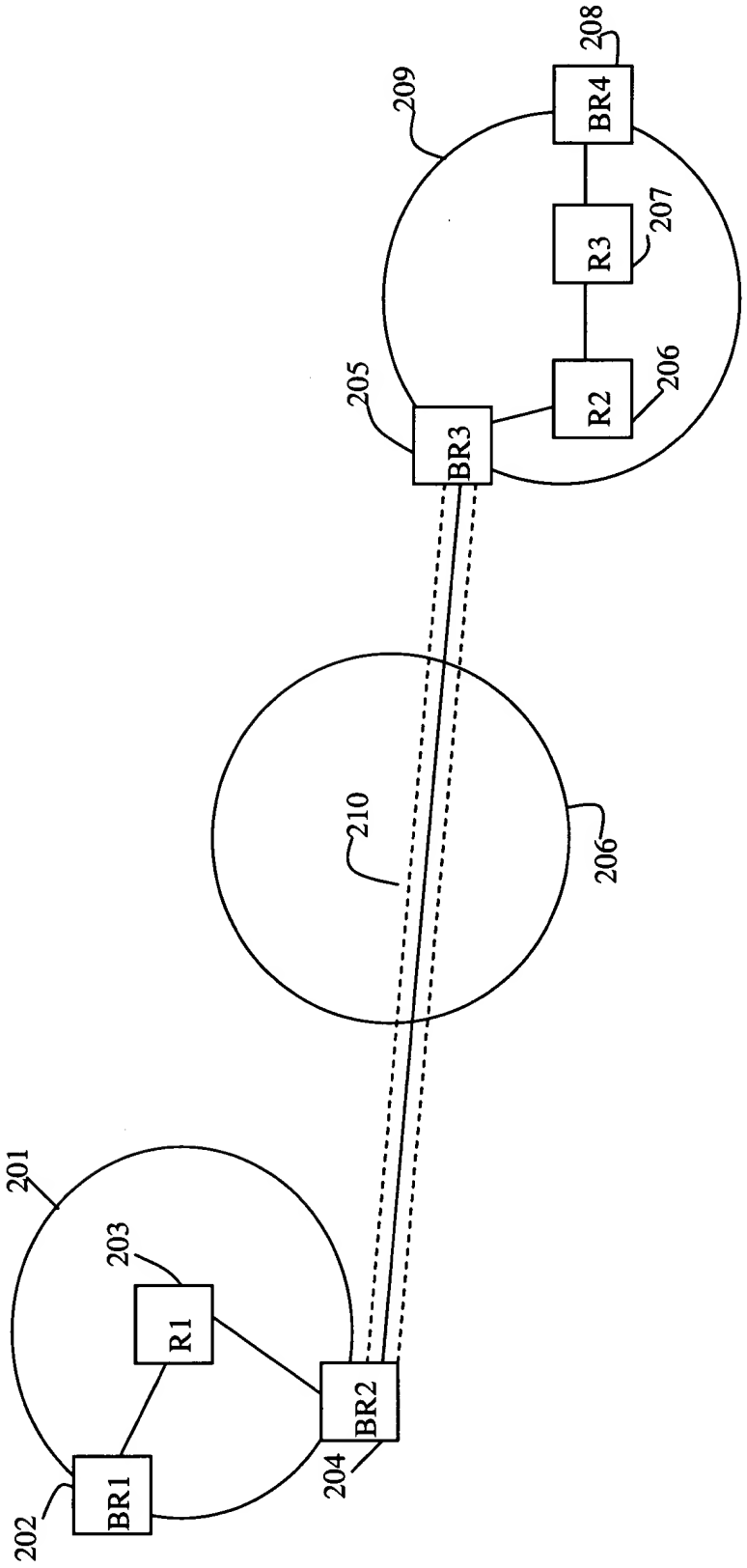


Figure 2

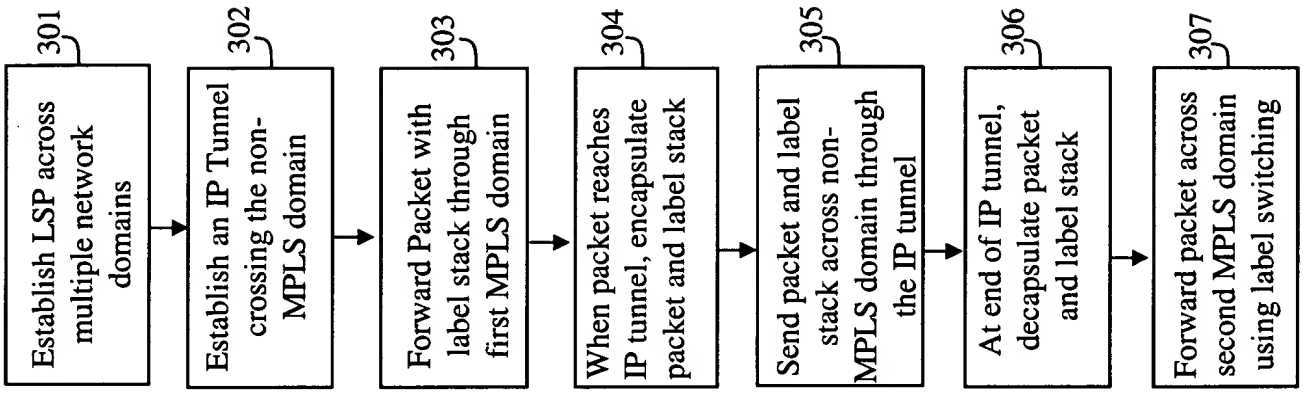


Figure 3

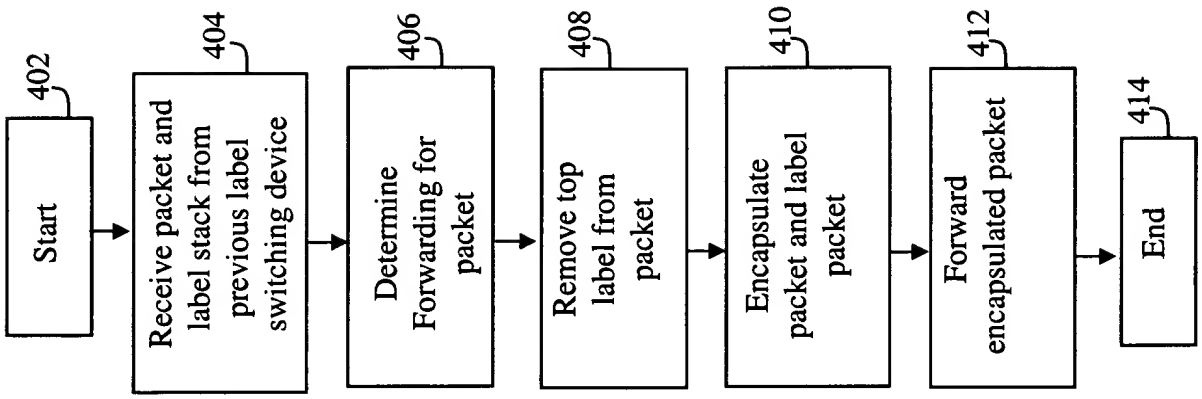


Figure 4

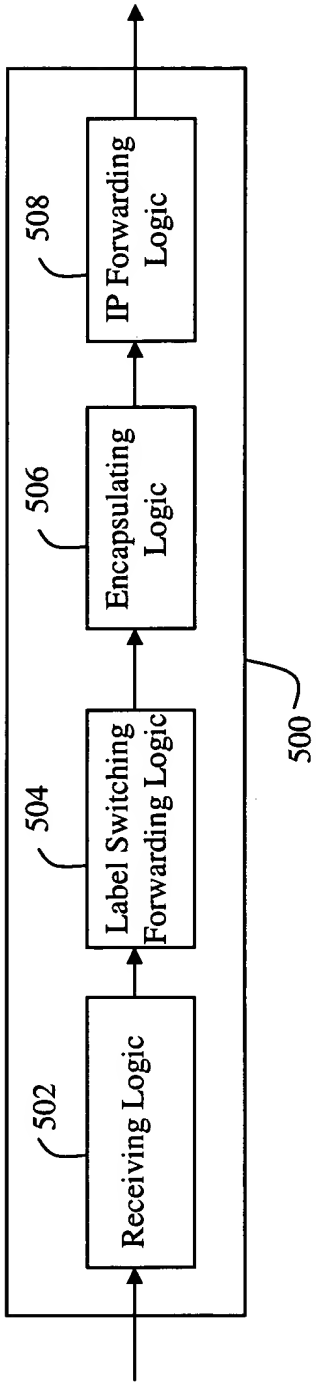


Figure 5

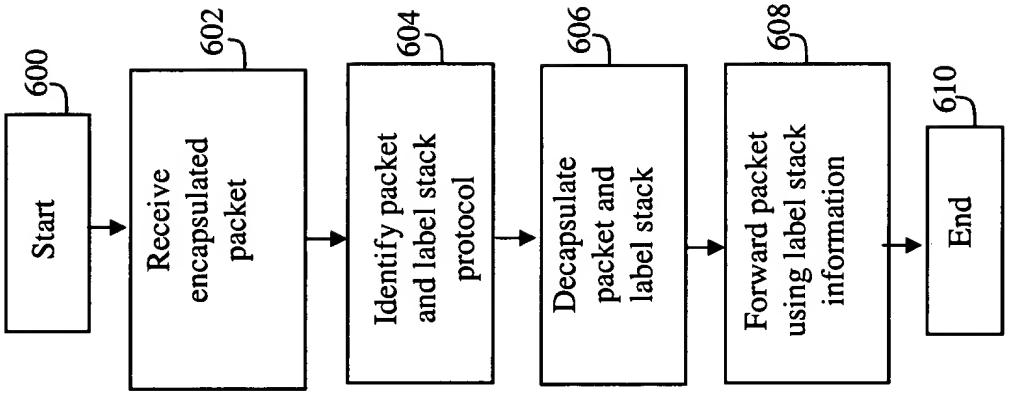


Figure 6

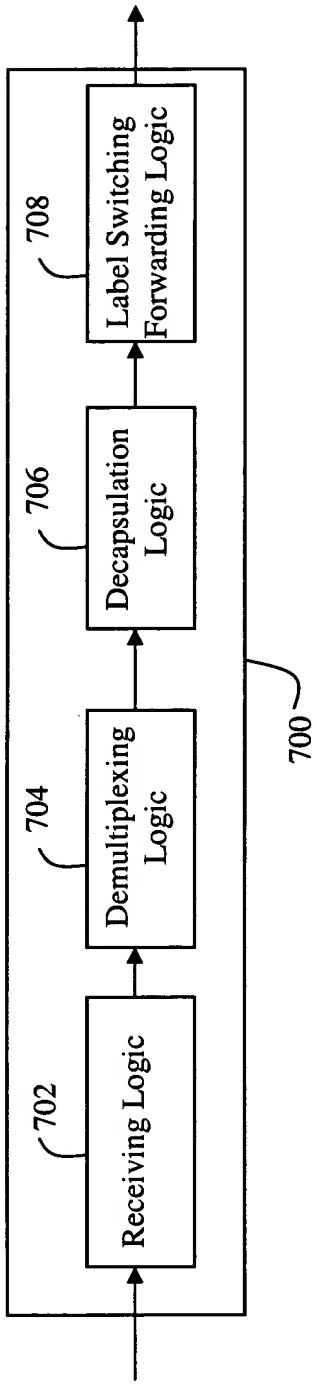


Figure 7

6A
2-17-04
mlg

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Hass	
Application No.: 09/528,261	Group Art Unit: 2661
Filed: 03/17/2000	Examiner: Wilson
Title: System, Device and Method for Supporting A Label Switched Path Across A Non-MPLS Compliant Segment	
Attorney Docket No.: 2204/A01 120-190	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

RESPONSE UNDER 37 CFR 1.111

Dear Sir:

In response to the Office Action of September 10, 2003, entry of this response is respectfully requested.

REMARKS

Reconsideration and further examination is respectfully requested. Claims 1-57 are currently pending. Claims 38, 44 and 45 are cancelled by this amendment. Claims 1-37, 39-43 and 46-57 are currently pending.

The Examiner has stated that IDS documents AF, AG and AH were missing from the file. Applicants have included the portions of these documents that were provided by the European search in the attached IDS.

Objection to the Drawings:

The drawings have been objected to by the Draftsperson as informal. Applicants have provided, attached hereto, a draft set of formal Figures to replace the informal figures. Acceptance of these Figures is hereby requested.

Rejections under 35 U.S.C. §103

Claims 1-57 were rejected under 35 U.S.C. §103(a) as being unpatentable over Casey (U.S. Patent 6,493,349 B1).

Casey:

Casey describes a VPN network infrastructure which enables private network communications over a shared network. The infrastructure includes a shared network partitioned into at least two separate areas. A first router is connected to a first area and configured to distribute first router VPN information across the first areas. The first router VPN information includes a VPN identifier which is assigned to the first router. It also includes a second router connected between the first area and a second area which is configured to distribute second router VPN information across the first area. The second router VPN information includes a VPN identifier which is assigned to the second router which is the same VPN identifier assigned to the first router. (Casey, Abstract).

Combination neither describes nor suggests claimed invention

In order to support a rejection under 35 U.S.C. §103, the combination of references cited by the Examiner must show or describe every limitation of the claimed invention. Casey does not meet this burden.

The Examiner states, at page 3 of the Office Action:

> "...Casey teaches: A method for establishing a label switched path for forwarding a packet with a label stack in a communication network (Figures 2 & 3 show a method for establishing a tunnel or forwarding a packet through a VPN AREAs in a communication network, where VPN area can be MPLS or label switched), the communication network including a first label switched domain and a second label switched domain interconnected by a non-label switched domain (Figure 2 & 3 shows establishing a tunnel or forwarding a packet through a VPN Area in a communication network where a VPN area can be MPLS or label switched as well as Dedicated IP Net GRE Tunnel area or non-label switched using VPN identifiers or labels for first and second domain)
>
> Establishing a tunnel across the non-label switched domain which connects the first label switched domain and the second label switched domain (Fig. 2 shows establishing a tunnel across VPN areas. Figure 3 shows the VPN areas can be MPLS or label switched and non-MPLS or non-label switched in any order).
>
> Encapsulating the packet and label stack to form a tunnel packet (Fig. 2 shows encapsulating a packet and label stack to form a tunnel packet across a VPN area or col. 6 line 21 – col. 7 line 36)
>
> forwarding the tunnel packet through the tunnel (Fig. 2 shows forwarding a tunnel packet through the tunnel between VPN Areas)..."

Applicants respectfully disagree with the Examiner's interpretation of Casey, for at least the reason that Casey neither describes, suggests or in any way addresses the notion of label stacks, or the implementation details of transferring label stacks across non-MPLS compliant devices.

The Examiner states that Casey teaches, at Figure 2, col. 6-7 the step of encapsulating the packet and label stack to form a tunnel packet. However, Applicant's reading of the portion of the specification, and examination of the Figures shown no such suggestion or teaching. Rather, Casey states, in this portion of the text, only (in part):

"... Fig. 2 illustrates a communication path between two private networks which traverses two VPN areas. Each VPN area is bordered by VBRs and contains other nodes that operate as part of the base network but are unaware of the IP VPN service because traffic is tunneled through them...

A form of VPNID is used in the VPN membership dissemination operation. Typically, this form of VPNID, which we call the local VPNID, has only to be unique within a VPN area. To facilitate re-engineering of VPN areas any VPNID used should be unique within an Autonomous System.

... Within each VPN area, a VPN area specific mechanism is then used to establish tunnels between all VRs serving the particular IP VPN. All private network traffic travels across a VPN area in a single tunnel hop. Traffic traveling between VPN areas is forwarded by VPs in the gateway VBRs that have been configured to be part of the VPN...

... In each VPN area a different tunneling mechanism choice may be in effect, depending on the base network. For example in one VPN area tunnels may be realized by GRE over a base network that is IP and in another tunnels may be realized by ATM SVCs over a base network that is ATM. The VRs in gateway VBRs transfer traffic between tunnels...."

Thus, although Casey generally describes VPNs, no mention, description or suggestion is made of the limitations of the claims, in particular "...establishing a tunnel across the non-label switched domain which connects the first label switched domain and the second label switched domain ... *encapsulating the packet and label stack to form a tunnel packet*..." as recited in independent claims 1, 10 and 19. For at least this reason, claims 1, 10 and 19 are patentably distinct over Casey, and the rejection should be withdrawn.

With regard to claim 2, the Examiner states "... the examiner interprets "Mapping a top label of the label stack" as VPNID per col 6, line 20 – col. 7 line 11) as claimed in claim 2..." However, Applicants note that the VPNID of Casey is not included in the encapsulated portion of the packet, as is the label stack of the present claims (step "encapsulating ... the .label stack" in claim 1). Accordingly, for at least this reason, claim 2 is also patentably distinct over Casey, and the rejection should be withdrawn.

With regard to Claim 9, the examiner states, at page 4 "... Wherein encapsulating the packet and label stack information includes providing an MPLS identifier in the tunnel packet such that the second label switched domain may identify the packet and the label stack (A VPNID per col. 6 line 21-col. 7 line 21 is provided to identify the encapsulated packet is tunnel across VPN Area which can be a MPLS or Non-MPLS area per Fig. 3 as claimed in claim 9.

Applicants respectfully disagree that the VPNID is analogous to an MPLS identifier. Applicants have amended claim 9 to more clearly distinguish claim 9 over Casey, and thus submit that Casey neither describes nor suggests "...providing an MPLS identifier in the tunnel packet such that the second label switched domain *may identify the packet as an MPLS type packet and retrieve and label stack...*" No such indication of type of protocol that is used in a VPN area is taught or suggested by the VPNID of Casey. For at least this reason, claim 9 is patentably distinct over Casey.

Independent claims 28, 34, 40, 46, 50, 53 and 57 include limitations similar to those in claims 1, 2 or 9 described above, and are therefore patentably distinct for at least the reasons described above.

Applicants have made a diligent effort to place the claims in condition for allowance. However, should there remain unresolved issues that require adverse action, it is respectfully requested that the Examiner telephone Lindsay G. McGuinness, Applicants' Attorney at 978-264-6664 so that such issues may be resolved as expeditiously as possible.

For these reasons, and in view of the above amendments, this application is now considered to be in condition for allowance and such action is earnestly solicited.

Respectfully Submitted,

2/3/2004
Date

Lindsay G McG

Mary Steubing, Reg. No. 37,946
Lindsay G. McGuinness, Reg. No. 38,549
Attorney/Agent for Applicant(s)
Steubing McGuinness & Manaras LLP
125 Nagog Park Drive
Acton, MA 01720
(978) 264-6664

CLAIMS

1. (original) A method for establishing a label switched path for forwarding a packet with a label stack in a communication network, the communication network including a first label switched domain and a second label switched domain interconnected by a non-label switched domain, the method comprising:

establishing a tunnel across the non-label switched domain which connects the first label switched domain and the second label switched domain;

encapsulating the packet and label stack to form a tunnel packet; and

forwarding the tunnel packet through the tunnel.

2. (original) A method according to claim 1, wherein establishing a tunnel includes mapping a top label of the label stack to the tunnel. (Maugor Fig 1+2)

3. (original) A method according to claim 1, wherein the tunnel is an IP tunnel. (casey col 7 lines 13-21 col 3 line 40)

4. (original) A method according to claim 3, wherein the IP tunnel is a Generic Routing Encapsulation (GRE) tunnel. (casey ⇒ col. 3 line 40 col 7 lines 13-21)

5. (original) A method according to claim 4, wherein encapsulating the packet and label stack information includes providing a label switching protocol identifier such that the second label switched domain may identify the packet and label stack. (Maugor casey)

6. (original) A method according to claim 1, wherein the first label switched domain is a Multiprotocol Label Switching (MPLS) domain. (Fig 3 casey)

7. (original) A method according to claim 1, wherein the second label switched domain is a Multiprotocol Label Switching (MPLS) domain. (Fig 3 casey)

8. (original) A method according to claim 1, wherein the first label switched domain is a MPLS domain and the second label switched domain is a MPLS domain. (Fig 3 casey)

9. (currently amended) A method according to claim 8, wherein encapsulating the packet and label stack information includes providing an MPLS identifier in the tunnel packet such that the second label switched domain may identify the packet as an MPLS type packet and retrieve and label stack.

10. (original) A device for establishing a label switched path for forwarding a packet with a label stack in a communication network, the communication network including a first label switched domain and a second label switched domain interconnected by a non-label switched domain, the device comprising:

label switching forwarding logic for identifying the next hop for the packet;

encapsulating logic for encapsulating the packet and label stack information to form a tunnel packet and for establishing a tunnel across the non-label switched domain which connects the first label switched domain and the second label switched domain; and

forwarding logic for forwarding the tunnel packet through the tunnel.

11. (original) A device according to claim 10, wherein the label switching forwarding logic includes mapping logic for mapping a top label of the label stack to the tunnel.

12. (original) A device according to claim 10, wherein the tunnel is an IP tunnel.

13. (original) A device according to claim 12, wherein the IP tunnel is a Generic Routing Encapsulation (GRE) tunnel.

14. (currently amended) A device according to claim 13, wherein the tunnel packet includes a label switching protocol identifier such that the second label switched domain can identify the packet as a label switched protocol packet and retrieve the ~~and~~ label stack.

15. (original) A device according to claim 10, wherein the first label switched domain is a Multiprotocol Label Switching (MPLS) domain.

16. (original) A device according to claim 10, wherein the second label switched domain is a Multiprotocol Label Switching (MPLS) domain.

17. (original) A device according to claim 10, wherein the first label switched domain is a MPLS domain and the second label switched domain is a MPLS domain.

18. (original) A device according to claim 17, wherein the tunnel packet includes an MPLS identifier such that the second label switched domain may identify the packet and label stack.

What is computer program packet ?
112 & 101

19. (original) A computer program packet for use on a computer system for establishing a label switched path for forwarding a packet with a label stack in a communication network, the communication network including a first label switched domain and a second label switched domain interconnected by a non-label switched domain, the computer program product comprising a computer usable medium having computer readable program code thereon, the computer readable program code including:

program code for establishing an IP tunnel across the non-label switched domain which connects the first label switched domain and the second label switched domain;

program code for encapsulating the packet and label stack information to form a tunnel packet; and

program code for forwarding the tunnel packet through the tunnel.

20. (original) A computer program product according to claim 19, further including program code for mapping a top label of the label stack to the tunnel.

21. (original) A computer program according to claim 19, wherein the tunnel is an IP tunnel.

22. (original) A computer program product according to claim 21, wherein the IP tunnel is a Generic Routing Encapsulation (GRE) tunnel.

23. (currently amended) A computer program product according to claim 22, further including program code for providing a label switching protocol identifier in the tunnel packet such that the second label switched domain may identify the packet as a label switched protocol packet and retrieve the ~~and~~ label stack.

24. (original) A computer program product according to claim 19, wherein the first label switched domain is a Multiprotocol Label Switching (MPLS) domain.

25. (original) A computer program product according to claim 19, wherein the second label switched domain is a Multiprotocol Label Switching (MPLS) domain.

26. (original) A computer program product according to claim 19, wherein the first label switched domain is a MPLS domain and the second label switched domain is a MPLS domain.

27. (original) A computer program product according to claim 26, further including program code for providing an MPLS identifier in the tunnel packet such that the second label switched domain may identify the packet and label stack.

28. (currently amended) A method for establishing a label switched path for forwarding a packet with a label stack in a communication network, the communication network including a first label switched domain and a second label switched domain interconnected by a non-label switched domain, the method comprising:

establishing a tunnel across the non-label switched domain which connects the first label switched domain and the second label switched domain;

receiving a tunnel packet from the tunnel, the tunnel packet comprised of an encapsulated packet and label stack, wherein the tunnel packet includes a label switching protocol identifier such that the second label switched domain may identify the packet as a label switched protocol packet;

decapsulating the encapsulated packet and label stack responsive to the label switching protocol identifier; and

forwarding the decapsulated packet and label stack across the second label switched domain.

29. (original) A method according to claim 28, wherein the first label switched domain is a MPLS domain and the second label switched domain is a MPLS domain.

30. (original) A method according to claim 28, wherein the tunnel is an IP tunnel.

31. (original) A method according to claim 30, wherein the IP tunnel is a Generic Routing Encapsulation (GRE) tunnel.

32. (cancelled)

33. (original) A method according to claim 29, wherein the tunnel packet includes a MPLS identifier such that the second label switched domain may identify the packet and label stack.

34. (currently amended) A device for establishing a label switched path for forwarding a packet with a label stack in a communication network, the communication network including a first label switched domain and a second label switched domain interconnected by a non-label switched domain, the device comprising:

receiving logic for receiving a tunnel packet from a tunnel across the non-label switched domain which connects the first label switched domain and the second label switched domain, the tunnel packet comprised of an encapsulated packet and label stack and a label switching protocol identifier such that the second label switched domain may identify the packet as a label switched protocol packet and retrieve the label stack;

decapsulating logic for decapsulating the encapsulated packet and label stack; and

forwarding logic for forwarding the decapsulated packet and label stack across the second label switched domain.

35. (original) A device according to claim 34, wherein the tunnel is an IP tunnel.

36. (original) A device according the claim 35, wherein the IP tunnel is a Generic Routing Encapsulation (GRE) tunnel.

37. (original) A device according to claim 34, wherein the first label switched domain is an MPLS domain and the second label switched domain is a MPLS domain.

38. (cancelled)

39. (original) A device according to claim 37, wherein the tunnel packet includes a MPLS identifier such that the second label switched domain may identify the packet and label stack.

40. (currently amended) A computer program product for use on a computer system for establishing a label switched path for forwarding a packet with a label stack in a communication network, the communication network including a first label switched domain and a second label switched domain interconnected by a non-label switched domain, the device comprising: the computer program product comprising a computer useable medium having computer readable program code thereon, the computer readable program code including:

program code for establishing a tunnel across the non-label switched domain which connects the first label switched domain and the second label switched domain;

program code for receiving a tunnel packet from the tunnel, the tunnel packet comprised of an encapsulated packet and label stack and a label switching protocol identifier such that the second label switched domain may identify the packet as a label switched protocol packet and retrieve the label stack;

program code for decapsulating the encapsulated packet and the label stack; and

program code for forwarding the decapsulated packet and label stack across the second label switched domain.

41. (original) A computer program product according to claim 40, wherein the tunnel is an IP tunnel.

42. (original) A computer program product according to claim 41, wherein the IP tunnel is a Generic Routing Encapsulation (GRE) tunnel.

43. (original) A computer program product according to claim 40, wherein the first label switched domain is a MPLS domain and the second label switched domain is a MPLS domain.

44. (cancelled)

45. (cancelled)

46. (currently amended) In a communication system having a first label switched domain interconnected with a second label switched domain by a non-label switched domain, a method for forwarding a label switched packet from the first label switched domain to the second label switched domain, the method comprising:

establishing a tunnel from an egress device of the first label switched domain to an ingress device of the second label switched domain over the non-label switched domain;

- encapsulating the label switched packet by the egress device of the first label switched domain;
- forwarding the encapsulated label switched packet by the egress device of the first label switched domain over the tunnel to the ingress device of the second label switched domain;

decapsulating the encapsulated label switched packet by the ingress device of the second label switched domain; and

forwarding the decapsulated label switched packet by the ingress device of the second label switched domain based upon label switching information in the packet, the label switching information including a label switch protocol identifier identifying the packet as a label switched protocol type packet, and at least one label.

47. (original) A communication system according to claim 46, wherein the first label switched domain is a MPLS domain and the second label switched domain is a MPLS domain.

48. (original) A communication system according to claim 46, wherein the tunnel is an IP tunnel.

49. (original) A communication system according to claim 48, wherein the IP tunnel is a Generic Routing Encapsulation (GRE) tunnel.

50. (currently amended) A tunneling protocol for interconnecting a first label switched domain and a second label switched ~~domain, the tunneling~~ protocol comprising:

encapsulation means for encapsulating a payload packet from a label switched protocol, the payload packet including at least one label; and

a protocol type indicator for identifying the label switched protocol, the protocol type indicator appended to the encapsulated payload packet for indicating to a receiving device that the payload packet includes at least one label.

51. (original) A tunneling protocol according to claim 50, wherein the label switched protocol is MPLS.

52. (original) A tunneling protocol according to claim 50, wherein the tunneling protocol is a modified Generic routing Encapsulation (GRE) protocol.

53. (currently amended) A communication system comprising a first label switched domain having an egress device, a second label switched domain having an ingress device and a non-label switched domain which couples the egress device of the first label switched domain to the ingress device of the second label switched domain, wherein a label switched path for forwarding a packet and a label stack is established by

establishing a tunnel from an egress device of the first label switched domain to an ingress device of the second label switched domain over the non-label switched domain;

encapsulating the packet and label stack by the egress device of the first label switched domain;

forwarding the encapsulated packet and label stack by the egress device of the first label switched domain over the tunnel to the ingress device of the second label switched domain;

decapsulating the encapsulated packet and label stack by the ingress device of the second label switched domain; and

forwarding the decapsulated packet and label stack by the ingress device of the second label switched domain based upon label switching information in the packet, the label switching information including a protocol identifier identifying the packet as a label switched protocol packet.

54. (original) A communication system according to claim 53, the first label switched domain is a MPLS domain and the second label switched domain is a MPLS domain.

55. (original) A communication system according to claim 53, wherein the tunnel is an IP tunnel.

56. (original) A communication system according to claim 55, wherein the IP tunnel is a Generic Routing Encapsulation (GRE) tunnel.

57. (currently amended) A communication system comprising:

a first label switched domain for forwarding a label switched packet, the first label switched domain having a plurality of label switching devices including an egress device;

a second label switched domain for forwarding the label switched packet, the second label switched domain having a plurality of label switching devices including an ingress device; and

a non-label switched domain having a plurality of forwarding devices, the non-label switched domain coupled the egress device of the first label switched domain to the ingress device of the second label switched domain; wherein:

the egress device establishes a tunnel from the first label switched domain to the ingress device of the second label switched domain across the non-label switched domain;

the egress device encapsulates the label switched packet;

the egress device forwards the encapsulated label switched packet over the tunnel to the ingress device of the second label switched domain, the encapsulated label switched packet including a protocol identifier for notifying the ingress device that the packet should be decoded according to a label switched protocol;

the ingress device receives the encapsulated label switched packet from the tunnel;

the ingress device decapsulates the encapsulated label switched packet; and

the ingress device forwards the decapsulated label switched packet based on label switching information in the packet.